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# ENGINEERING AND CONSTRUCTION BULLETIN

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**Subject:** Lifting Chain Design for Tainter Gates and Roller Gates

**Applicability:** Information

1. Lifting chains (using pins, rollers, and sidebars) for tainter and roller gates have been, for many years, a source of operation and maintenance problems at gated spillways owned and operated by the U.S. Army Corps of Engineers. This type of chain is difficult to lubricate, causing bearing surfaces to corrode and bind which prevents smooth operation of the chain over the sprocket. As a result, spillway gates could not be operated, chains failed, and gates dropped, creating both a dam safety problem and a safety hazard for operating personnel.
2. Saint Paul District has been using a new chain design since 1997 that eliminates the need to lubricate the chain. Results thus far indicate that the problems identified above have been resolved. Eliminating the need to lubricant the chain also eliminates environmental problems caused by chain lubricant entering the waterway. Timothy Paulus, P.E., a mechanical engineer at Saint Paul District, authored a paper (with illustrations) titled "Lifting Chain Design for Tainter Gates and Roller Gates" that presents an engineering analysis, and discusses material selection, corrosion prevention, maintenance issues, and life cycle costs for the new chain design. The web address for the paper is <http://www.hnd.usace.army.mil/techinfo/ECB/Liftchain2001.pdf>.
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